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MEETING PLACE

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BATS IN MY BELFRY

SERVING THE HANDICAPPED

THE NEEDLE IN THE HAYSTACK: A DISCOVERY IN IRAN

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BATS IN MY BELFRY

The ROM *is becoming a world centre for study of these much-maligned but fascinating mammals*

R. L. PETERSON, Curator of Mammalogy

THE Department of Mammalogy is located in a tower which rises above the main part of the Royal Ontario Museum building. While there is no bell in the tower, there are certainly plenty of bats, with more coming in daily from all around the world. If we have our way, our "belfry" will become the focal point of a leading world centre for bat research.

Canada has a comparatively small bat fauna, with only six genera and nine species east of Manitoba. The greatest number of bat species live near the equator, with their number diminishing as one proceeds north or south to higher latitudes. Unfortunately, bats have long been considered rather undesirable creatures. They have been regarded as symbols of doom and darkness, and associated with haunted houses and blood-thirsty horror stories in the Dracula tradition. No other group of mammals seems so shrouded in folklore, mystery and misinformation. A demented person is said to be "batty" or to have "bats in his belfry". A person with defective eyesight is said to be as "blind as a bat". A person making a hurried retreat is said to go like a "bat out of hell". Bats appear along with spooks and goblins at Hallowe'en, and are supposed to attack women and get tangled up in their hair. Some of our less desirable female citizens may be referred to as "old bats". Perhaps we shouldn't even mention Batman!

As in most similar circumstances, dislike, fear and distrust stem from unfamiliarity with the animals in question. Actually bats are a most fascinating group. No other mammal has developed the ability to fly, although several are able to glide. The bat wing is in reality a modified hand. The thumb is retained, complete with claw, as a short digit for clinging or crawling, while the fingers are greatly elongated to support the thin double layer of skin.

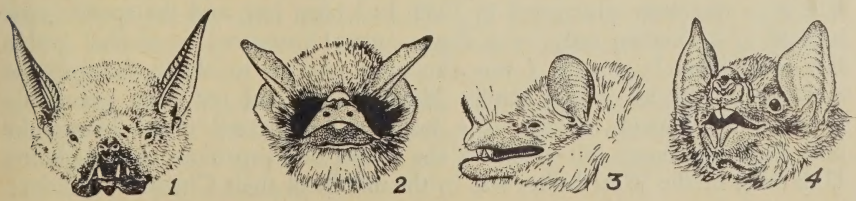
Many species have developed an intricate and highly effective sonar system. Though they are primarily nocturnal, and many live in the furthest recesses of caves, bats are able to fly about avoiding all objects or obstructions. For centuries they have been credited with a "sixth sense", but only since World War II has careful research with electronic equipment allowed us to begin to understand the true mechanism.

By means of a specialised larynx, bats emit pulses or "beeps" of high-frequency sound at regular intervals, usually between 20 and 60 times per second. They can vary the pulse rate at will, and each "beep" usually lasts less than one hundredth of a second (10 milliseconds). When these sounds strike an object, they are bounced back and picked up by the sensitively tuned ears or "receivers". The external ears, and perhaps the nose-leaves of certain species, act as direction finders and amplifiers. Bats not only vary the length of pulse and the pulse rate; they also can modulate or vary the frequency at will. Of the bats studied so far, the frequency usually falls between 20 and 100 kilocycles.

This echo-locating system apparently reaches its highest development among the insect-feeding bats who use it not only to navigate and avoid objects, but also to locate and "home in" on their flying prey. An insectivorous bat may cruise along hunting for food with "beeps" at intervals of 50 to 100 milliseconds at a frequency somewhere between 45 and 100 kilocycles. When a flying insect is "picked up" the pulse rate is speeded to as high as 250 beeps per second (with the interval between reduced to 5 or 6 milliseconds), the pulse duration is reduced, perhaps to 0.5 milliseconds, and the frequency drops to about 50 to 25 kilocycles as the bat zeros in on the prey. The insect may be caught in the bat's mouth; or it may be caught with the wing membrane, or the membrane between the hind legs, and held long enough to be transferred to the bat's mouth.

While all Canadian bats, and the majority of other species, feed on insects, several tropical groups have become adapted to live on other foods. At least two different species catch fish! Once I had the delightful experience of watching the large "bulldog" bats, *Noctilio leporinus*, flying low over the Abary River in British Guiana, with their greatly enlarged feet (armed with fishhook sharp claws) dragging through the water until there was a "strike". Then the feet were raised and pulled forward and the fish transferred to the bat's mouth.

Four bats from British Guiana: 1. Fish-eating bat, *Noctilio leporinus* (wing span 22 in.) 2. Moustache bat, *Chilonycteris rubiginosa* (wing span 15 in.) 3. Long-tongue bat, *Glossophaga longirostris* (wing span 11 in.) 4. Vampire bat, *Desmodus rotundas* (wing span 16 in.)



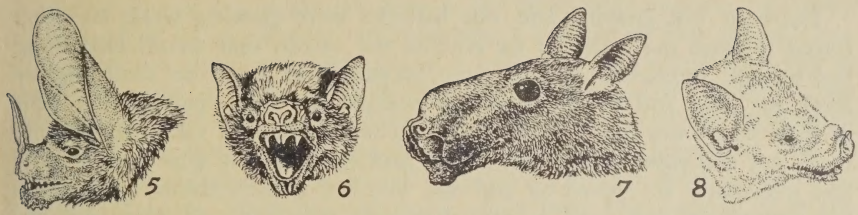
At least one species of South American bat is known to catch other bats, lizards, small mammals and perhaps birds. Among the most specialised feeders are the vampire bats. Three species, all restricted to Central and South America, exist solely on fresh blood. My first encounter with the common vampire bat, *Desmodus rotundas*, came in the summer of 1941 in Mexico when I was the assistant leader of a zoological training expedition. One night we arrived at a new campsite rather late. Since the area seemed free of mosquitoes, two of us did not take the precaution of erecting nets over our cots. The next morning we found our forearms scratched and our arms and bedding covered with dried blood. During the night we had provided meals for one or more vampires without being fully awakened. We were little concerned as at that time we were unaware that vampire bats are active carriers of rabies.

In 1961, at the Regional Virus Laboratory in Trinidad, I encountered rabid vampire bats showing a variety of symptoms. In most other mammals, this disease runs a rather short violent course ending in death. The rabid bat, however, remains an active carrier for a protracted period, spreading the virus as it feeds on other animals night after night. Some of the bitten animals are bats of other species, so while vampires are the most active carriers, all New World species may potentially spread this disease.

In British Guiana, where there is much cattle ranching on the southern Savannah, we found that bat-transmitted rabies was a serious economic as well as health problem. In one season alone it killed more than 5,000 head of cattle on the million-acre ranch which was our temporary headquarters. In our efforts to assist the rancher by collecting as many vampire bats as we could, one of our field party was bitten. This time we knew the dangers involved. We rushed the victim by air to Georgetown for antirabies shots.

In the tropics live a large number of species of fruit-eating bats. One group has become adapted to feeding on nectar, which they retrieve from flower blossoms with a long protrusile tongue; they thus parallel humming birds and bees in their eating habits. In the West Indies, a small group of "flower" bats combine nectar and pollen in their diet.

This past Christmas, I took my family to Jamaica—openly for a brief winter "vacation", covertly in hopes of finding an unusually rare species. The type specimen, discovered in 1889, had been lost, and the species now seemed to be known only by a single animal preserved in alcohol and a few fossil bone fragments. I was also most anxious to obtain examples of a particular species in the family *Natalidae*. It had not been previously recorded for Jamaica, except as a fossil, and appeared to be known by only three specimens, all taken on the island of Hispaniola. Although the University of the West Indies was in the middle of their Christmas holidays,



5. Fringed-lip bat, *Trachops cirrhosus*, from British Guiana (wing span 21 in.) 6. White-spotted vampire bat, *Diaemus youngii*, British Guiana (wing span 16 in.) 7. Hammer-headed bat, *Hypsignathus monstrosus*, Africa (wing span 36 in.) 8. Jamaican flower bat, *Phyllonycteris aphylla* (wing span 12 in.)

its zoology staff kindly arranged an expedition to St. Clair Cave, some 50 miles northwest of Kingston.

The visit proved far more exciting than I had dared hope. After climbing for almost an hour, we arrived at a large vertical sink hole almost overgrown with tropical vegetation. We lowered ourselves to the bottom by rope. Then we proceeded down on about a 45-degree angle, through a passage almost choked with boulders, until we reached what was obviously an old underground river bed. St. Clair Cave is about two miles long. We headed for a section known as "inferno passage".

Our route followed a sloping ledge covered with about 10 inches of wet mud and bat guano, with a sheer drop to a boulder-strewn body of water below. As we climbed higher the temperature rose until there seemed to be no air, and moisture dripped constantly from the ceiling. Here, almost immediately, we discovered the species of *Natalus* I was so anxious to obtain.

After working this area for about an hour, we decided to press on. My companions suggested that we take down the mist net we were using; but since I had a spare net in my pack we left the other set, to be picked up on the way back. We explored as long as we dared, then returned to "inferno passage". As our lights swung on the net we had almost taken down, a cold chill suddenly engulfed me. The tortuous climbing, depressive heat and high humidity had reduced me to a state near complete exhaustion, but the sight before me brought on such a thrill of excitement that I was dancing around exuberantly and undoubtedly babbling incoherently. Here in the net hung not one, but two beautiful examples of the flower bat, *Phyllonycteris aphylla*, the species previously known by a single specimen! Also, the net had trapped another species of flower bat, *Erophylla sezckorni syops*, which is not so rare as the first, but nonetheless was new to our collection.

The hour was growing late, our batteries were growing weak; we were forced to leave the cave. As we entered the cavern that would lead us to the surface, thousands of bats were preparing to leave on their nightly foray for food and by the time we reached the main passage the whir of their wings was like a giant motor. At one bottleneck we could literally reach out and catch bats of all shapes and sizes as they flew past. Finally and reluctantly we moved on and out. We had already stayed too long. It was completely dark, and as we laboriously stumbled and scrambled our way back down to our truck the rain poured down. But we had secured almost 150 specimens of nine different species. This had truly been the most exciting bat collecting experience of my life.

The day was not over, however. Back in Kingston, after a much needed bath, and in clean clothes, we carefully weighed, measured and prepared every one of our specimens. My wife and daughter had already retired for the night; they accompanied me to a laboratory of the University of the West Indies where Dr. John Parnell and Mr. Tom Turner, my companions on the cave visit, joined as at work. At 3 a.m. we were finally deposited back at our hotel. What a way to spend a holiday!

Bats (Order Chiroptera) constitute the second largest group of living mammals, exceeded in number of kinds only by the rodents. There are close to 1,000 different species known today. Counting subspecies or geographic races, almost 2,000 kinds have been discovered and named.

The Department of Mammalogy of the Royal Ontario Museum has embarked on a special bat research project, for which specimens are being collected from all round the world. The plan was conceived some five years ago. The first step was to establish a small special trust fund into which all available money was channelled. Last year the fund at last seemed large enough for us to begin work. A small booklet, *Collecting Bat Specimens for Scientific Purposes,* was published, and we began enlisting potential collectors in various parts of the world. The response and results have been rather staggering.

Significant collections have already been received from British Guiana, Surinam, Colombia, Brazil, British Honduras, Jamaica, England, Ghana, Tanzania, Malawi, Malaysia, Borneo and Pakistan. Exchange with other institutions has provided us with specimens from most of the United States, Mexico, El Salvador, Belgium, Czechoslavakia, Tanzania and Ethiopia. We have established contact with other collectors who have promised to collect for us in Guatemala, Cuba, Puerto Rico, Cameroons, Southern Rhodesia, South Africa, Ceylon, Philippines, Australia and New Zealand. New contacts are being established each week.

As specimens arrive from around the world and more and more rare species become represented, our collection grows increasingly important. In certain

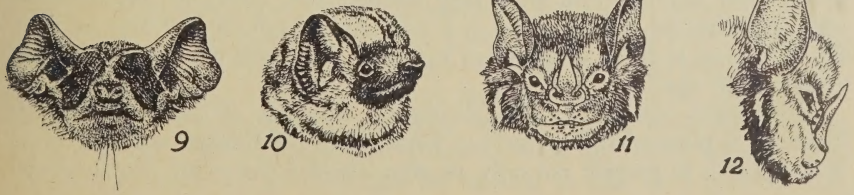
groups, it now equals or exceeds those of the other great museum collections of the world. As an example, only recently a number of bats arrived from Ghana, among them two specimens of a small fruit bat which according to recent literature is known by only four other specimens, two in the British Museum and two in the Berlin Museum. A recent ROM scientific publication reviews all the known specimens of the genus *Ametrida*: there were only 30 located in 12 different institutions of the world, and three were in the Royal Ontario Museum. Since its publication, three more have arrived from our collector in British Guiana.

In another paper "A review of the flat-headed bats of the family *Molossidae* from South America and Africa" (ROM Life Science Contribution 64), I described a new genus of which only seven specimens were known outside the ROM; we now have about 36. Of the 17 different families of bats, the ROM now has representatives of all but two, one found only in New Zealand and the other only in Madagascar. In 1954 the ROM had 841 bat specimens; in 1959 the total was 972; today it exceeds 5,000.

At present we also have a local bat research project under way. A graduate student, Mr. M. Brock Fenton, is carrying out studies of the general ecology of eastern Canadian bats including the microclimatic evaluation of hibernating sites, winter and summer movements, growth and development, interspecies relationships and various other avenues of investigation.

We are concerned with a much broader consideration of the Order Chiroptera than the question of mere rarity or uniqueness. We are especially interested in speciation in its broader sense, which involves morphological development and variation, ecological adaptation and distribution as well as phylogenetic relationships and zoogeographical considerations. Already our bat collection contains key specimens which will allow clarification of dozens of taxonomic problems. The neglect of this group of mammals in years past has left us with a virtual gold mine of opportunity to contribute new knowledge to the growing spectrum of science.

9. Free-tailed bat, *Tadarida europs*, British Guiana (wing span 12 in.) 10. Hoary bat, *Lasiurus cinereus*, Ontario (wing span 14 in.) 11 and 12. *Ametrida centurio*, British Guiana (wing span 8 in.)



In total, our bat research program has become a "tiger by the tail". It has developed so rapidly and with such momentum that we are now hard pressed to cope with it. We need more funds to keep our network of collectors active; we need more manpower to process the specimens and data and to carry out the research problems which demand attention; and finally we need more space, especially storage cabinets in which to house our expanding collections. Rather than wait to find the solution to these problems, we find the challenge so exciting that we intend to press on at full speed, in spite of the great possibility that people will shake their heads and mumble "the guy has got bats in his belfry".

SERVING THE HANDICAPPED

The museum opens new worlds to the blind, the deaf, and the crippled

NORMA HEAKES, Supervisor, Education Department

"THAT ALL MEN MAY KNOW HIS WORK" is the inscription spelled out in the glittering mosaic ceiling of the Royal Ontario Museum. This quotation from the book of Job is a fitting statement of the general objectives of the museum. The word ALL is of particular significance to those who work with handicapped people. The reminder of everyone's heritage is housed in the museum, yet for some disabled persons it is difficult or impossible to study or enjoy its treasures.

Sometimes Mohammed goes to the mountain. Last week 15 or 16 youngsters converged upon the solarium of the Ontario Crippled Children's Centre for the weekly meeting of the Royal Ontario Museum Club. All were resident patients of the Centre. Some were on crutches, some in wheel chairs—they can go the fastest—and some on stryker beds. All were looking forward to an hour's fossil hunting. Nor were they disappointed. Everyone left the hunt with an ammonite, a brachiopod or a trilobite. Everybody had new information and ideas to think about. "Just imagine! This fossil may have lived 500 million years ago."

This project, initiated by the Members' Committee of the Royal Ontario Museum, is planned and carried out jointly with the Education Department. Its purpose is to provide not only an after-school activity but also an oppor-

tunity for these children to broaden their horizons through contact with the museum.

This is not a simple lecture illustrated with slides. The master of ceremonies for the day will have spent considerable time selecting artifacts and specimens from the museum collections. The pace of the meeting will be slow. Each child must have time to handle the fossils, the snowy owl, or the quartz crystal. Each must be encouraged to express his ideas. It does not matter if all the museum objects have not been used. What does matter is that the pale tired child on the stryker bed now has a spark of interest in her eye and colour in her cheeks. For a few minutes she has been lifted into a different world.

When crippled children from either the Centre or Sunnyview School visit the museum, the selection of objects is not a problem: the exhibits are waiting for the children. Rather, details about the physical arrangement of the building must be considered. How many wheel-chairs are coming? How many stairs lie between the geology gallery and the Indian galleries? Is someone free to load us all onto the freight elevator? Oddly enough, details like these never upset anyone. Everybody—teachers, guards, bus drivers and children—is always in good humour, flexible and ready to take advantage of the unexpected. Some of us still remember the day 23 whistling swans settled on the water of Toronto Bay. The boys from Variety Village were quickly transported to the waterfront instead of to a gallery.

The Crippled Children's Club is only one of the contacts which the Education Department has with groups or individuals who have difficulty in visiting the museum. On two different occasions, a Royal Ontario Museum teacher has been the guest of the Ontario School for the Deaf at Belleville. Both visits proved to be mutual learning experiences. Before the museum teacher could make the contents of her travelling box meaningful, she had to learn the teaching methods used in the school. Very little sign language is used. A combination of speech, speech-reading, silent reading and writing are used in what is known as the Oral Method. The groups in the school are arranged according to vocabulary and word structure level, not content, which explains the wide age range (11–21 years) in the Intermediate and Senior Schools. At first one feels that the museum lesson is purely a vocabulary exercise. This feeling changes within a couple of days. Once names are attached to artifacts, questions and comments create a lively atmosphere.

There were two direct results of the contact with the Ontario School for the Deaf. First, Belleville students made a day-long trip to the museum where they continued and expanded the work that had been started in the classroom. Second, the experience gained with Belleville pupils made the museum teacher eager and able to co-operate effectively with the North York Hard of Hearing Unit. In this group pupils are trained to take their place in the

regular classroom. The visits to the museum were planned to increase the pupils' vocabulary, broaden their information, and, most important of all, to whet their curiosity. They were shown films, taken round the galleries, and given the opportunity to handle authentic objects. The visit also involved the pupils in new social situations. Finding the price of a sandwich was a real test of their ability to read the lips of total strangers.

One of the most exciting experiences for handicapped and museum staff has been with adults. It started, really, with the publication of *Beauty for the Sighted and The Blind* by Allen H. Eaton (St. Martins Press, New York, 1959). A volunteer at the Canadian National Institute for the Blind, feeling keenly about the book's implicit message to museum personnel, gave a copy to the Director. The challenge was accepted.

Mr. Eaton feels that it is the moral obligation of museums to ensure that the handicapped become and remain part of the total community life. He stresses that blindness and other disabilities leave the individual intact and that mental and spiritual potentials of the person need not be damaged. He describes how communication between the sighted and the blind can be encouraged by sharing the world of beauty. A heterogeneous collection of objects was chosen which appealed to the sighted and interested the blind. The essential elements of beauty, form, order, and proportion were found in the starfish, the quartz crystal, and a piece of Royal Copenhagen porcelain. Colour is an important consideration; it adds to the enthusiasm of the sighted which, in turn, enhances the description of the object.

The program for the blind at the Royal Ontario Museum was inspired by this book but is not patterned after that developed by its author. The Canadian National Institute for the Blind organizes the groups interested in museum study. Our original intent was to give a general survey of the work of various departments. By the second year the response was so great that a second group was organized to run concurrently with the survey series. This group concentrated upon four areas only: ancient China, ancient Egypt, textiles, and European glass and porcelain.

Every meeting was an event in itself. Just how important was brought home to us when we discovered that one man came weekly, with his wife, 110 miles from Bracebridge. During the survey course, the blind discussed and handled the remains of prehistoric animals. They held and studied 17th-century European glass and Chinese porcelain. They identified minerals by the mineralogist's tests—hardness, texture, crystal structure and specific gravity—using equal-sized cubes of ten different minerals, specially prepared by the curator. The blind examined by touch the various skin coverings of mammals, from the shell of the armadillo to the silky fur of the lynx. They listened to musical instruments ranging from harpsichords to gut buckets, the modern version of a mediaeval monochord. Every session introduced new

ideas and exciting facts. More satisfying to some was the opportunity to give shape to words they had known all their lives: "I've often wondered how big a bat is."

There were many surprises for both the sighted and the blind. A special felting process was used on a mimeograph machine to reproduce Egyptian hieroglyphs. The sensitive fingers of the blind quickly learned to recognize and translate the characters. It was fascinating to watch them make the transition to incised hieroglyphs on authentic tablets. Another moment of delight occurred when one individual was able to differentiate between two European porcelains, one of the 17th century and the other of the 18th century.

The program with the blind is truly one of mutual learning. The museum staff find that it is a challenging experience. It has insisted that we look at our material from quite a different angle. It has demanded that we review and revise our methods of presentation.

The curators found that minor adjustments had to be made in the selection of the objects—but not in the content of their information. A more concise vocabulary had to be used to replace visual recognition. Good enunciation and slowness of speech were essential if everyone was to hear.

The articles chosen from a collection must be selected for their appeal to the senses. The size, the shape, the texture of the surface are qualities which will help to identify three-dimensional objects. Articles seen by the blind should be as perfect as possible: sensitive fingers frequently concentrate upon the flaw—the chip in the plate. There should be a variety of specimens so that appreciation and recognition can be made through comparison. As many samples as possible of one thing are necessary so that the whole group can "see" while the leader is describing it.

From our experience we have found that it is preferable to sit at tables set up in a U shape, with the lecturer and volunteers on the inside. A table is the home base. It gives peace of mind to the curator and security to the blind. Although the blind are noted for the care with which they handle objects, they must have some place upon which to rest them. A table also gives the visitor an opportunity to use both hands for exploring, and psychologists claim that both hands are needed for maximum sensation. Finally, people seated around a table can hear the lecturer and each other better. This last point is important. There is always cross-conversation. At first we found it disconcerting. Comments, questions, exclamations would often interrupt the person conducting the meeting. Yet verbal expression is a natural response for the blind. How else can they share their ideas? A smile or a lifted eyebrow has no meaning.

The role of the volunteer is most important in our program. The volunteer meets the visitor at the entrance and guides him to the meeting place. As they

walk through the galleries the volunteer will keep up a running commentary about where they are, stop to "show" a piece of sculpture, or announce the exact number of steps they are about to ascend.

The first collection of objects for the education of the blind was made in Vienna by Johann Wilhelm Klein between 1804 and 1809. Since then many museums in Europe and North America have made sporadic efforts to serve this minority group. Most programs have been short lived.

There appears to be a need for a permanent museum program not only for the blind but for all handicapped persons. It can no longer be an incidental visit added to the schedule at a slack season. Nor will ramps for wheel chairs and braille labels be enough. A study of the various disabilities represented is basic to the work. Our guests' limitations must be known. A survey of what has been done or what is being done by other museums would be valuable. The time seems to be ripe for the development of a permanent program which will be integrated with the life of the museum and the community.

THE NEEDLE IN THE HAYSTACK

A 30,000-mile search produces an important new record of man's early progress in Iran

T. Cuyler Young, Jr., Assistant Curator
Near Eastern Department

It was hard to see the bottom of the ford. The rushing mountain stream was boiling across the road, swollen by melting snows and recent rains. All we could see was that the truck ruts went into the water at one point and came out at another. The problem was to judge exactly where in the middle of the stream the solid track was. We guessed wrong. Halfway across, the left tire of the Land Rover slipped into deep water, the foam came surging up over the hood, drowning the carburetor and shorting the spark plugs. There was nothing to do but take off our trousers and wade back to shore. Fortunately, a truck was pulled up for the night at a small Kurdish tea house a little distance back from the ford. We got a tow line attached to the Rover, and with wheels spinning madly in the mud, the truck pulled us out. It was now too late in the day to try the ford again and go on, so we unloaded our gear and joined the truck driver, his helper, and some local villagers in the tea house for the night.

It was a friendly tea house, and we were soon caught up in the conversation around a crude iron stove in the middle of the room. The truck driver told a harrowing tale of how the autumn before he had tried a run just a few days too late in the season over this trail, had got caught in a snow storm, and spent five months waiting in this tea house for spring to come. Now spring was here, and he was making his second trip of the new season. How long would it take to get to Sar Dasht, our destination? Well, he had come from there today. He had started at dawn and made this tea house by dusk. We had started this morning from the other end of the trail—Mahabad—and had managed to come about thirty miles. Another day to Sar Dasht added up to two full days—thirty hours—to go about sixty miles.

The trucker's helper turned to me and asked, "Why are you going to Sar Dasht?" I replied, "To look for mounds—sites of ancient occupation in the Sar Dasht valley." I went on to try to tell him how the pass west of Sar Dasht was one of the main routes used by the ancient Assyrians in their campaigns into the Iranian mountains, and how, therefore, there was a good chance of finding an important Assyrian town site somewhere in the region. He looked at me as though I were completely out of my mind, and asked, "Who pays for this?" "The Royal Ontario Museum, the University of Toronto, and anyone else who would like to help," I answered. He bought me a tea (perhaps the tenth glass we had had, but it is one way to keep warm), thought for a while about my answer, and said, "And they pay you to look for these mounds?" I tried to explain that they paid me for this and a good many other things too, but he didn't seem to think that nearly as impressive as being paid to look for ancient mounds.

As we crawled into our bedding for the night, he shook his head again, and said, "What's the profit in it for them?"

"What, no profit—no return in money?"

"No. No money profit, but profit nevertheless."

"Crazy fools," he muttered.

The fleas kept us awake all night, and by morning I wasn't sure that I didn't agree with the young man's judgment. When we got to Sar Dasht the next day, however, and found the huge mound we had suspected might be there, I no longer felt the fool.

Most of the roads we travelled last year in western Iran were not as bad as this one. Some indeed were very good, else we would not have been able to cover about 30,000 miles in the time we had, or locate, examine and map some 200 new archaeological sites in Kurdistan and Azerbaijan. At five different places we probed up to the Iranian-Iraqi border as we had at Sar Dasht, looking over all of the major mountain passes used by the Assyrians in the first millennium B.C. in their campaigns against the fierce hill peoples who lived in the Zagros mountains. At all of these passes we found sites.

Back from the border, in less isolated and wild country, we surveyed the valleys of Hamadan, Arak, Saveh, Zanjan, Kangovar, Bisitun, Kermanshah, Sanandaj and Sar Pol-i Zohab. Another trip took us to the north, where we explored a string of valleys along the Russian-Iranian border west of Astara. Gradually a picture of changing settlement patterns over the area became clear. We were able to eliminate certain valleys as having been less important, and to concentrate our attention on those areas where best results could be anticipated. By the middle of the summer, after we had already spent about four months in the field, we had narrowed our search down to the area of modern Kangovar and Bisitun.

What exactly were we looking for, and why had we come to concentrate our attention on the Kangovar-Bisitun area of western Iran? Part of the answer is found in the article "Next Step from Hasanlu," *Meeting Place*, Vol. 1, No. 4, 1965. The ROM was looking for a site to excavate over the next four or five years in western Iran, where it could make a significant contribution to the development of our understanding of the prehistory of this region, recently brought into focus by the excavations at the site of Hasanlu in northwestern Iran, to which the museum and the university contributed. This meant we were looking for a site where first millennium B.C. materials rested on or near the surface of a large mound, underlain by a maximum depth of occupational deposit dating to still earlier periods. The further back the sequence went the better, for we were also co-operating with the university's Department of Anthropology; Dr. Philip Smith was looking in the same area for a cave or early mound with materials dating back to the pre-pottery Neolithic and the Palaeolithic periods. If we could find a number of sites which met all of these requirements in a single, fairly limited area, we could then excavate an unusually long sequence of material and, at the same time, bring other experts into the project to study the natural environment—the geography, geology, flora, fauna and climate of the valley. This would give our archaeological study the depth it needs so that we might understand the fluctuating local history of man against the natural environment. In other words, we are concerned with more than archaeology alone. We would like to develop as broad a picture as possible of the ecology of the area chosen for detailed examination.

Three sites which met our archaeological requirements were found in the Kangovar-Bisitun region, and the area itself was small enough to permit a fairly complete study of the environment by natural scientists. Two of these sites, the Palaeolithic cave of Ghar-i Khar and the aceramic Neolithic mound of Ganj-i Dareh, were sounded in test excavations by Dr. Smith. The mound chosen for preliminary excavation by the ROM is Godin Tepe, located at the southeastern corner of the Kangovar valley at an altitude of about 4600 feet above sea level. The mound is roughly oval, covers approximately 25 acres

and rises to a height of about 100 feet. Here we dug from mid-September to early November, and recovered, in two fairly small test trenches, a preliminary section of the site from the summit to virgin soil.

Tentatively, this sequence can be divided into seven main cultural phases (numbered from the top down). Period I is represented by a single occupation of recent date: an Islamic fortification no older than the 18th century A.D. Period II is a thin stratum of loose wash, with pottery dating to between the 8th and 4th centuries B.C. Period III, the first important occupation which we uncovered, was represented by about 26 feet of deposit and several construction levels. Evidence indicates that the last occupation in this period was probably destroyed by an earthquake. The period probably dates to c. 2000–1600 B.C.

In Period IV we came across evidence for a culture characterized by a distinctive type of incised grey pottery which heretofore had not been found in western Iran south of modern Tabriz. This culture has strong connections with eastern Turkey and the Caucasus mountain region, and its appearance in central western Iran indicates a migration southwards of a people from the north. Before our excavations this important historical event was not even suspected. We can only guess at the dates for Period IV at Godin Tepe, but something in the neighbourhood of 2700–2000 B.C. is reasonable.

Period IV, however, was not our last surprise. In Period V we excavated two construction levels which date to the Uruk period in Mesopotamia (3500–3000 B.C.). Here again we had stumbled across something quite new and rather unexpected, for this is the first solid evidence from excavation for the Uruk culture in western Iran. Interest in this period, of course, centres around such problems as the beginnings of urbanization and writing in Mesopotamia. Just what the relationship between Godin V and the Uruk culture in the southern Tigris and Euphrates river valleys is we cannot yet say, but further excavation should tell us much.

Below period V is a deep deposit of mixed occupational trash and decayed mud walling defining Period VI. The pottery from these strata can be tentatively dated to c. 5000–3500 B.C. Period VII, which was rather shallow and rested on virgin soil, represents a very early occupation of Godin in the pottery Neolithic period. A comparison of the pottery and small artifacts found with similar finds at other sites in western Iran suggests a date in the range from 5500–5000 B.C.

Potentially, if we are able to continue our excavations, Godin Tepe is a most important site. Its size and location indicate its continuous importance as a major town site in central western Iran, and the length of its cultural sequence would probably be hard to match at any other site in the region. We have only made a beginning, however, and it will take a great deal more work to realize the full potential of this remarkable mound.

In the last week of the dig we made a chance find which dramatically demonstrated the strong element of luck in archaeology and which went far to make up for the fact that Period II had been a disappointment at Godin. One of our workmen came to me at tea break and told of a large block of stone, lying in a village built on a mound down the road. According to his story the stone had a picture of a "great king" on one side and strange writing which no one could read on the other. I thought it unlikely that this stone was of any importance, for one is always hearing such stories, checking up on them, and finding nothing more than a gravestone perhaps two or three hundred years old. Still, duty demanded that we check, so one rainy day when work was impossible at Godin we drove the four miles to the village of Nejafabad to see the stone . . . and stumbled onto the most important single find of the whole expedition. Sitting in a hole in the centre of a village street, where it had been found some three years before by local people digging a foundation ditch for a new house, was a block of metamorphosed limestone about 5½ feet long, 26 inches wide and 27½ inches thick (we found out later that it weighed about three tons). On one side, even in the gloom of a heavy rain, one could see a relief of an Assyrian king. On two of the remaining three sides of the block were 75 lines of Neo-Assyrian cuneiform inscription: the detailed record of an Assyrian military campaign into the Zagros mountains and the first Neo-Assyrian inscription found in Iran.

We immediately communicated with the Iranian Archaeological Service in Tehran, and they at once sent a man armed with the necessary authority and money to transport the stone to the National Museum. It took us four days to record our find *in situ*, and almost a whole day to load it into a truck for the trip to Tehran. No equipment was available, and moving three tons of rock with primitive levers onto a ten-ton truck in such a fashion that no damage was done to the relief or to the inscription was a tricky project. It was all very much worth the effort, however, for when this inscription is read and published in detail we shall know a very great deal more about the Assyrian period in western Iran.

From the point of view of the truck driver's helper we were, and still are, a bunch of fools. I wonder, however, whether if he met us once again in that tea house and we told him of what, in one sense, we had found at the end of the road to Sar Dasht, he would come to see the point of it all. I think he might. He is an Iranian, and an Iranian has, beneath the surface, a strong sense of history. Why should he not? He lives in a country where a tradition of settled life goes back into the sixth millennium B.C. And somewhere back there his roots and ours spring from a common stock.